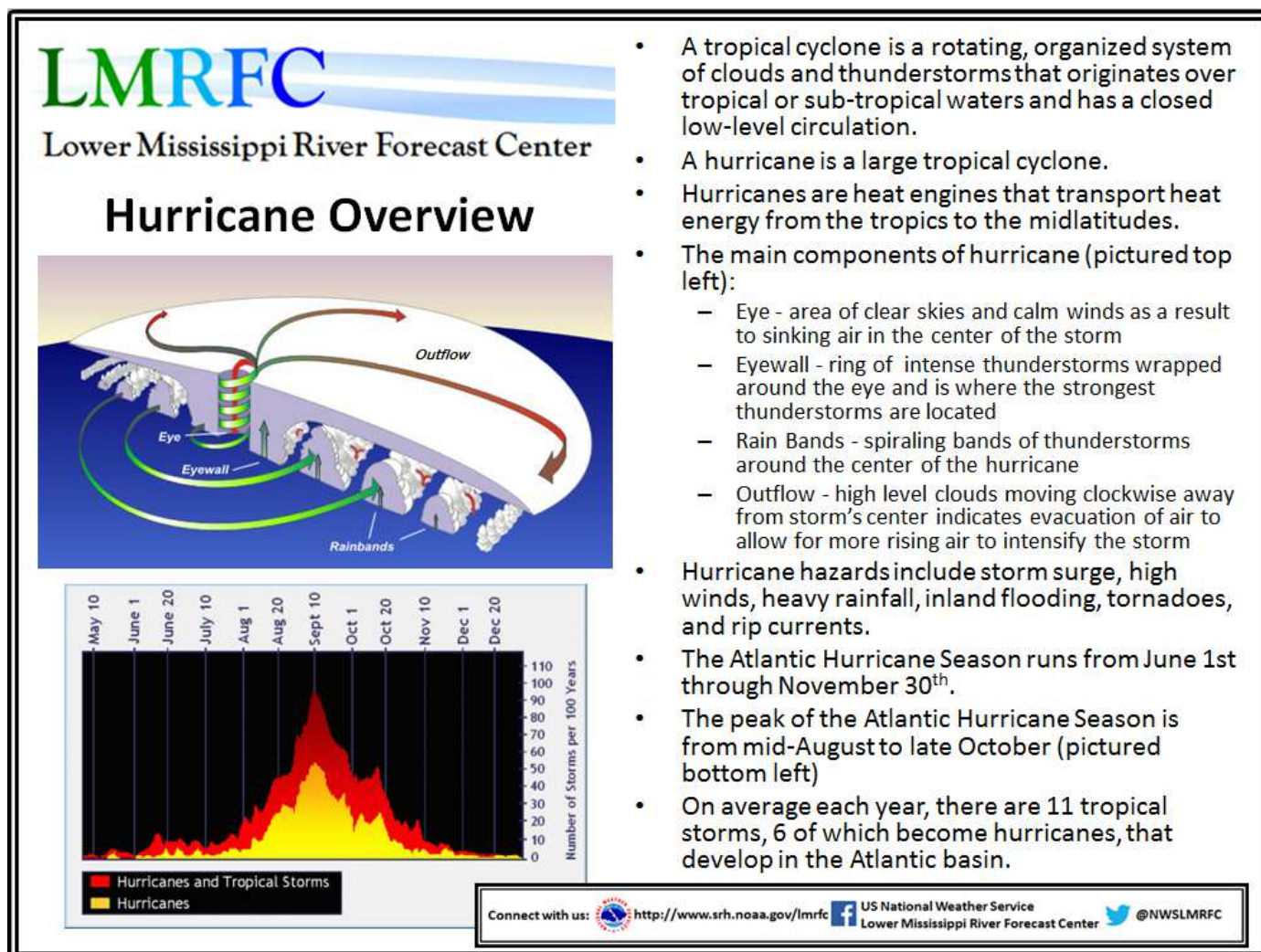


June Monthly Educational Module

“Hurricane 101”


Day 1

This month the Lower Mississippi River Forecast Center is talking all about hurricanes! To start, we are going to give a quick overview of hurricanes. Check out the graphic below to learn a little background information on hurricanes and hurricane season.



Day 2

Our next topic is hurricane classifications! Have you ever wondered why hurricanes are named or how we classify tropical cyclones? Well, you are in luck! Check out the graphic below to learn more about tropical cyclone classifications and the hurricane naming convention.



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Hurricane Classifications




Atlantic Names

[Atlantic Pronunciation Guide \(PDF\)](#)

2014	2015	2016	2017	2018	2019
Arthur	Ana	Alex	Arlene	Alberto	Andrea
Bertha	Bill	Bonnie	Bret	Beryl	Barry
Cristobal	Claudette	Colin	Cindy	Chris	Chantal
Dolly	Danny	Danielle	Don	Debby	Donan
Edouard	Enka	Earl	Emily	Ernesto	Erin
Fay	Fred	Fiona	Franklin	Florence	Fernand
Gonzalo	Grace	Gaston	Gert	Gordon	Gabrielle
Hanna	Henri	Hermine	Harvey	Helene	Humberto
Isaias	Ida	Ian	Irma	Isaac	Imelda
Josephine	Joaquin	Julia	Jose	Joyce	Jerry
Kyle	Kate	Karl	Katia	Kirk	Karen
Laura	Larry	Lisa	Lee	Leslie	Lorenzo
Marco	Mindy	Matthew	Maria	Michael	Melissa
Nana	Nicholas	Nicole	Nate	Nadine	Nestor
Omar	Odelia	Oto	Ophelia	Oscar	Olga
Paulette	Peter	Paula	Philippe	Patty	Pablo
Rene	Rose	Richard	Rina	Rafael	Rebekah
Sally	Sam	Shary	Sean	Sara	Sebastian
Teddy	Teresa	Tobias	Tammy	Tony	Tanya
Vicky	Victor	Virginie	Vince	Valerie	Van
Wilfred	Wanda	Walter	Whitney	William	Wendy


- Tropical cyclones are named differently across the world. They are called hurricanes in the Atlantic Ocean, typhoons in the Western Pacific Ocean, and simply cyclones in the Indian Ocean.
- Hurricanes start off as tropical disturbances and are classified by stages in development.
- Tropical Disturbance – A disorganized cluster of clouds and thunderstorms in an area of low pressure
- Tropical Depression - An organized system of clouds and thunderstorms with a closed low-level circulation and maximum sustained winds of 38 mph (33 knots) or less
- Tropical Storm - An organized system of strong thunderstorms with a well-defined circulation and maximum sustained winds of 39 to 73 mph (34-63 knots)
- Hurricane - An intense tropical cyclone with a well-defined circulation and sustained winds of 74 mph (64 knots) or higher
- Major Hurricane - An intense hurricane with maximum sustained winds of 110 mph (96 knots) or higher. This corresponds to Categories 3, 4, and 5 on the Saffir-Simpson Hurricane Wind Scale

Hurricane names help in communicating about storms, especially when there are two or more occurring at once. There is a 6 year cycle of names (pictured above) in which names are reused after 6 years unless the name gets retired (ex: Katrina, Andrew, Rita, Wilma, etc.). Hurricane names are both male and female and are ordered alphabetically. However, they do not contain names starting with Q, U, X, Y and Z because of their scarcity. Names are assigned when a tropical depression becomes a tropical storm.

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Day 3

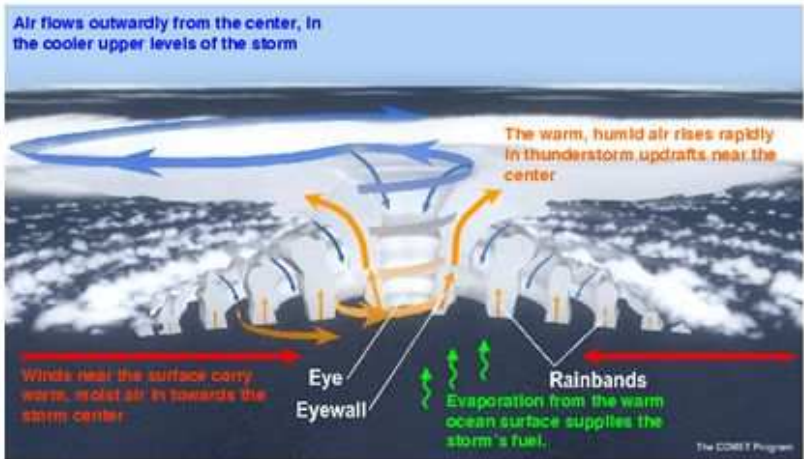
Up next is hurricane formation! Hurricanes don't just pop out of nowhere. They start off as a cluster of thunderstorms and go through a series of development stages (as discussed previously). Now, we are talking about how a cluster of thunderstorms develops into the powerful natural disaster that we call hurricanes. To learn more about how hurricanes form, check out the graphic below.



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Hurricane Formation




- Hurricanes are products of a warm, moist atmosphere which is why hurricanes form in the tropics.
- Most hurricanes form between the latitudes of 5 and 30 degrees over all the tropical oceans (except the south Atlantic and the eastern South Pacific)
- The two main ingredients for tropical cyclone formation and intensification are warm water and a lack of change in wind speeds and directions.



The diagram illustrates the formation of a hurricane. It shows a cross-section of the ocean and atmosphere. At the bottom, the ocean surface is labeled 'Evaporation from the warm ocean surface supplies the storm's fuel.' Arrows indicate air rising from the surface into the atmosphere. In the center, the 'Eye' and 'Eyewall' are labeled. 'Rainbands' are shown as curved lines of clouds. Text boxes explain: 'Air flows outwardly from the center, in the cooler upper levels of the storm' and 'The warm, humid air rises rapidly in thunderstorm updrafts near the center'. A red arrow at the bottom left states: 'Winds near the surface carry warm, moist air in towards the storm center.'

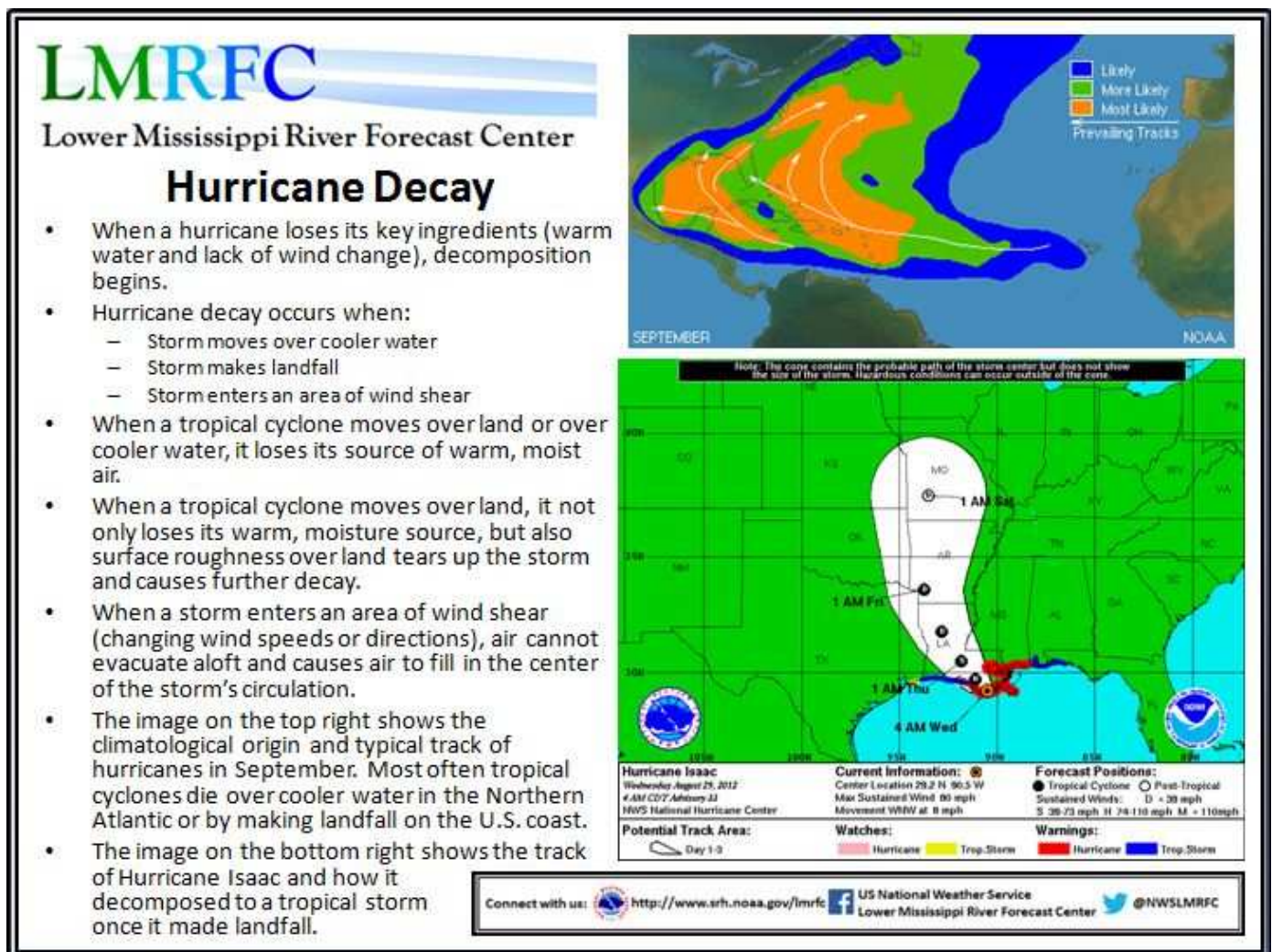
Hurricane Formation:

1. Thunderstorms develop from the evaporation of warm, moist air from the ocean beneath. If there is a lack of change in wind speeds and direction, air moves away from the thunderstorms in the upper levels of the atmosphere.
2. Once a cluster of thunderstorms develop, more rising air results in a relative low pressure area at the surface. Low pressure causes warm, moist air to move inward toward the center at the surface and continue the cycle of air rising and moving outward aloft.
3. As the cycle continues, the low pressure area becomes low enough that it causes the storm to rotate around the central low pressure, and a tropical cyclone can form. As long as the key ingredients are present, the storm continues to intensify until hurricane decay occurs.

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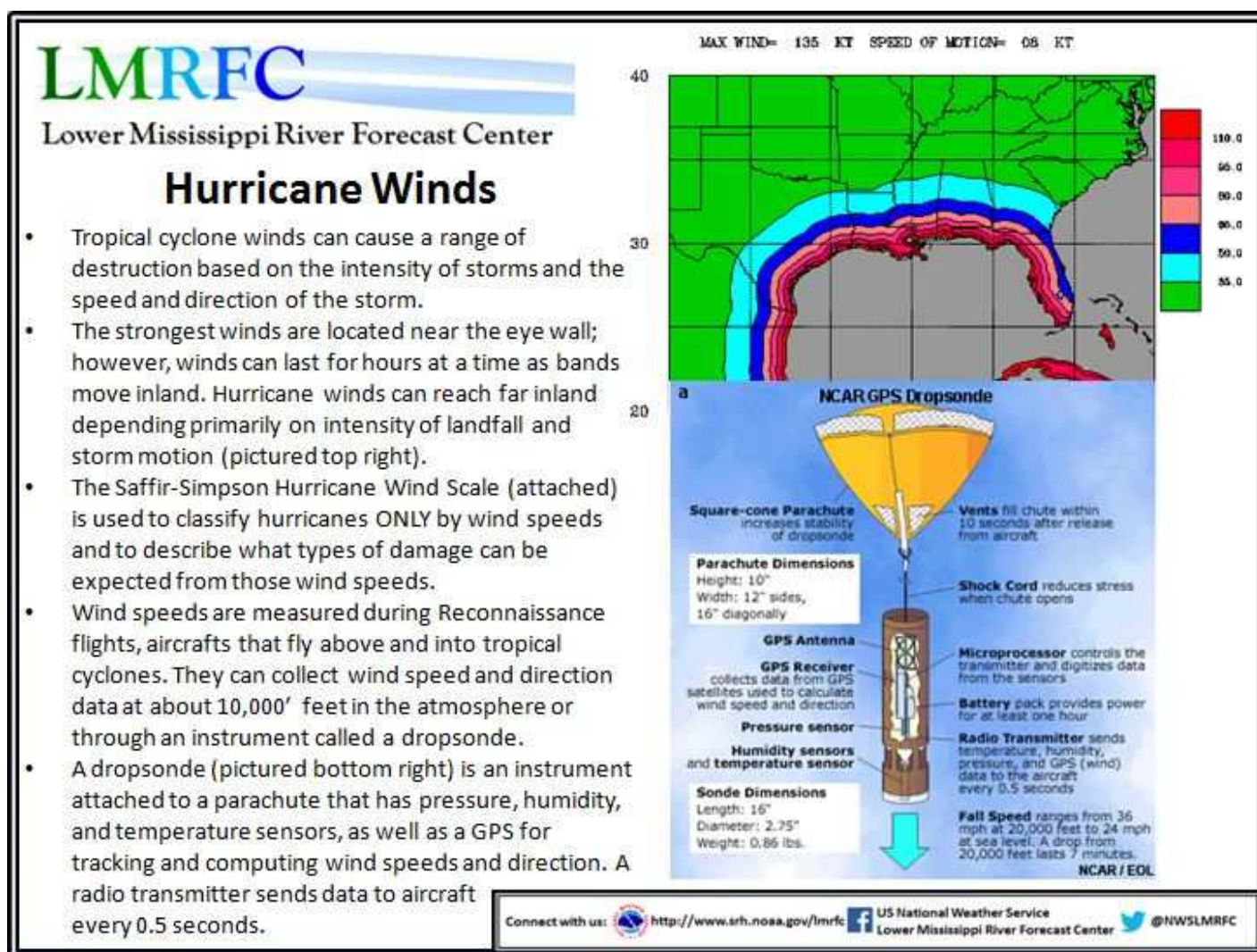
Day 4

In the previous topic, we talked about how hurricanes form; however, the most common question on everyone's mind is... "How do hurricanes die?" This module post focuses on hurricane decay. If you want to learn more about how tropical cyclones die, check out the graphic below.



Day 5

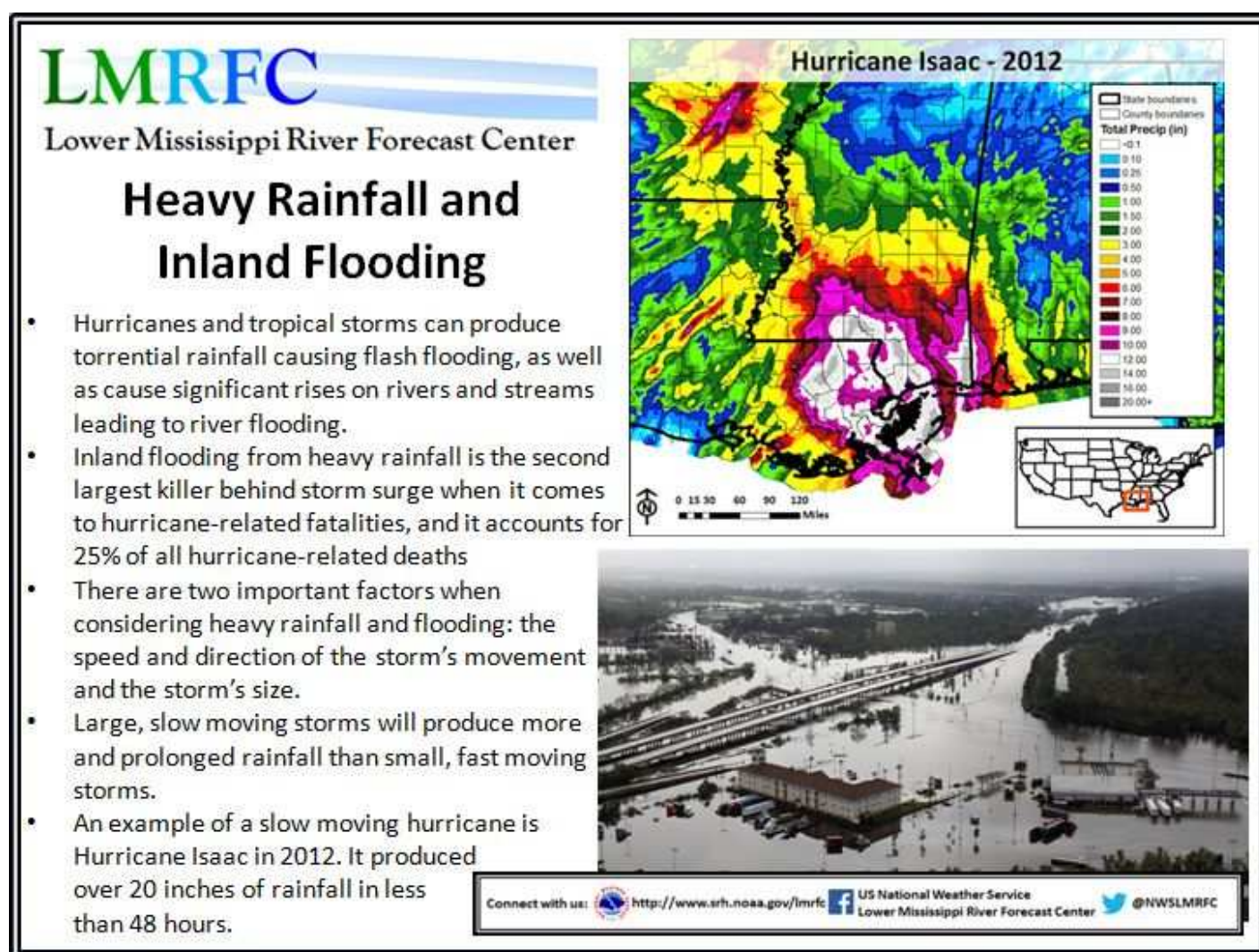
Now that we have covered general hurricane information and the formation and decay of hurricanes, we are going to shift gears and talk more about hurricane hazards. The three main hurricane hazards are storm surge, wind damage, and inland flooding from heavy rainfall. We are going to start off by discussing hurricane winds. Check out the graphic below to learn more about the hurricane hazard...winds!



Day 6

In the previous post, we discussed the three main hurricane hazards, in particular, hurricane winds. Now, we want to continue highlighting hurricane hazards with heavy rainfall and inland flooding. Check out the graphic below to learn more about this hurricane hazard!

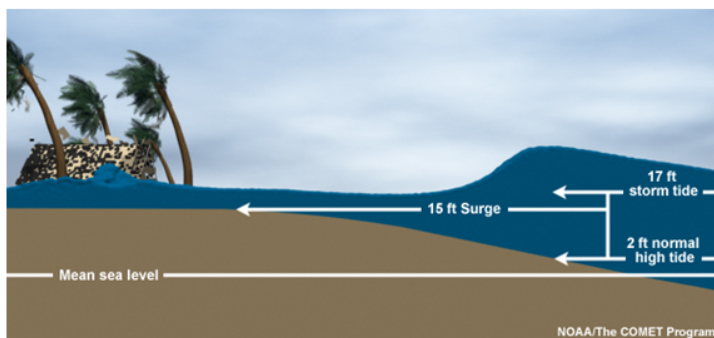
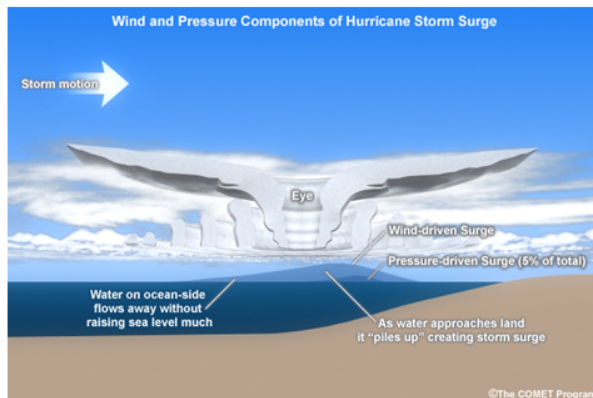
Source: NBC



Day 7

Are you ready to learn more about hurricane hazards?!? Well, you are in luck! Up next, we are covering the hurricane hazard...storm surge! Storm surge is often the greatest threat from a hurricane. If you want to learn more about storm surge, check out the graphic below.

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Storm Surge

- Storm surge is the piling up of ocean water by strong onshore winds from a tropical cyclone (pictured top left). Hurricane winds push water toward the shore, causing the sea level to rise in addition to violent wave activity.
- Storm surge is dependent on several factors, including tropical cyclone winds, the continental shelf, and inland elevation and topography.
- Storm surge is always the most intense on the right side of the storm because the winds are the most intense as they are blowing toward the shore. On the left side of the storm, winds are blowing away from the shore.
- Storm surge potential changes due to the continental shelf. The shallower the shelf is, the higher the water can build up.
- River channels and inlets "funnel" storm surge and increase the storm surge impacts further inland.
- Low elevations inland can also cause the storm surge to move further inland.
- Contrary to popular belief, the impact of low pressure from the storm is minimal in comparison to the strong winds being forced toward the shore.
- Storm Surge vs Storm Tide (pictured bottom left)
 - Storm Surge is the water that is forced toward the shore by the storm's spiraling winds
 - Storm Tide is the combination of the storm surge and the normal tide

Day 8

We are wrapping up hurricane hazards by highlighting two other hazards...rip currents and tornadoes. These two hazards pose a significant threat during hurricanes and are important to understand. Check out the graphics below to learn a little more about rip currents and tornadoes with hurricanes.

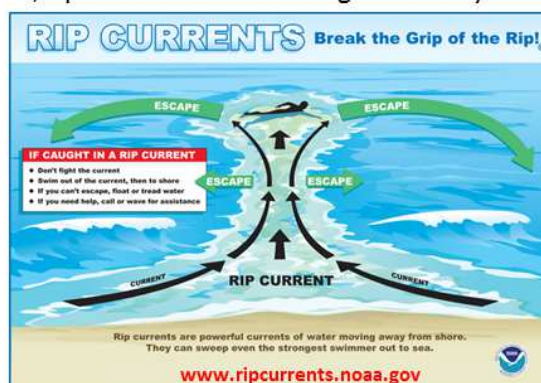
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Rip Currents

- A rip current is a stream of water extending from or near the beach seaward through the breaker zone in a relatively narrow jet.
- The primary driver of rip currents are waves NOT wind. Winds can cause waves, but rip currents can occur during calm winds as well. Rip currents are primarily surf dependent.
- The fact that we see rip currents, often with strong onshore winds, is because those winds cause local wind waves and those wind waves cause the rip currents. Rip currents can occur with offshore winds too.
- Strong winds associated with a tropical cyclone can cause dangerous waves that increase the potential of rip currents. Even at large distances from tropical cyclones, rip currents can be strong and deadly.



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Tornadoes

- A tornado is a rotating column of air with circulation reaching the ground.
- Hurricanes can produce tornadoes. These tornadoes occur in thunderstorms embedded in rain bands, usually away from the center of the tropical cyclone. Tornadoes produced by tropical cyclones usually are short-lived and relatively weak; however, they do pose a big threat and have the potential for significant damage.
- Hurricanes can also produce tornado-like winds.
- An Extreme Wind Warning is issued by NWS when a major hurricane is about to make landfall. This warning is issued to alert citizens of the rapid onset of destructive winds (tornado like winds) associated with the eye wall of major hurricanes.



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Day 9

We are winding down our 6th Monthly Educational Module, but we are saving the best ones for last! Next up, we are talking all about hurricane products and the forecast process. First off, the National Hurricane Center is the one who issues all the official tropical cyclone forecasts and guidance products. However, local Weather Forecast Offices issue more detailed forecasts for their specific areas, and River Forecast Centers use the National Hurricane Center's forecasts in their river forecasts and guidance products. If you would like to learn more about the tropical cyclone forecast process, check out the graphic below provided to you by the US National Weather Service New Orleans office. Also, if you would like to learn more about the National Hurricane Center's hurricane-related products, check out our module graphic below as well.

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the size of the storm. Hazardous conditions can occur outside of the cone.

8 PM Fri
8 PM Thu
8 PM Wed
8 PM Tue
8 PM Mon
2 AM Mon

Graphical Tropical Weather Outlook
National Hurricane Center Miami, Florida

Tropical Cyclone Activity is Not Expected During the Next 48 Hours

Go to Eastern Pacific Outlook

200 PM EDT THU JUN 26 2014 Satellite Image: 1252 PM EDT

Outlined areas denote current position of systems discussed in the Tropical Weather Outlook. Color indicates probability of tropical cyclone formation within 48 hours.

Low <30% Medium 30-50% High >50%

Hurricane Products

- Tropical Weather Outlooks (pictured bottom left) and Discussions are issued 4 times a day to highlight where there are areas of tropical cyclone activity and what the probability is of tropical cyclone formation.
- Public Advisories offer critical hurricane watch, warning and forecast information.
 - Watches – means tropical storm or hurricane conditions are possible in your area within the next 48 hours
 - Warnings - means tropical storm or hurricane conditions are expected in your area within the next 36 hours
- Forecasts/Advisories provide detailed tropical cyclone track and wind field information.
- Probabilities offer locally specific chances of experiencing tropical storm, strong tropical storm and hurricane force winds out to 5 days.
- Forecast Cone (pictured top left):
 - Represents the most likely path of the center of the tropical cyclone and is designed that the center of the tropical cyclone will stay inside the cone 2/3 of the time. This means 1/3 of the time the storm can move outside of the cone
 - Impacts can extend beyond the cone borders (especially for larger storms). So, even if you are not in the cone, that doesn't mean you won't feel the impacts. Be sure to look at forecast impacts not just the cone.
- Hurricane Local Statements are prepared by local National Weather Service offices in or near a threatened area that give greater detail on how the storm will impact that area. Specific details include weather conditions, evacuation decisions made by local officials, and other precautions necessary to protect life and property
- Resources:
 - National Hurricane Center: <http://www.nhc.noaa.gov/>
 - Local Weather Forecast Offices: <http://www.weather.gov/>

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Hurricane Forecast Process

Data Collection



Quality Control

Initial Conditions

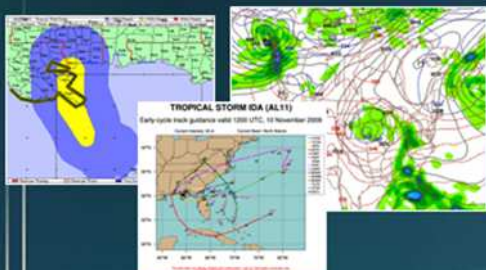
Mathematical
Equations

Meteorologist Expertise
And Interpretation

Computer Models



Model Forecasts



Finalized Forecast



NWS New Orleans/Baton Rouge
www.weather.gov/neworleans




US National Weather
Service New Orleans



@NWSNewOrleans

Day 10


This is our last post of our June Monthly Educational Module on hurricanes; however, we are leaving you with the best one for last! Check out the graphic below to get some interesting facts on hurricanes and some hurricane preparedness tips!



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Hurricane Preparedness




- Create an emergency plan.
- Have an emergency kit ready.
- During an extended power outage, ATMs & credit card machines may not work. Include extra money in your emergency kit.
- Prepare your home for heavy winds by covering windows, cleaning gutters, and trimming trees. And, bring in all outdoor furniture & secure anything else that isn't tied down, should a storm threaten the area
- Follow evacuation orders.
- Keep hurricanes in mind when planning summer vacations



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Interesting facts

- At one point, Hurricane Katrina's central pressure was 902 millibars, the fifth lowest on record in the Atlantic Basin. Hurricane Wilma was the lowest recorded pressure in the Atlantic Basin.
- The word "hurricane" is derived from the Mayan storm god, Hunraken.
- Larger hurricanes are not necessarily stronger than smaller hurricanes. There is very little correlation between size and intensity. For example, Hurricane Andrew was a very intense storm (Category 5) but was relatively small.
- Hurricane Hunters collect data from in and around tropical cyclones. NOAA hurricane hunters fly through storms in their P-3 aircraft or fly above storms in their G-IV aircraft. The US Air Force 53rd Weather Reconnaissance Squadron primarily flies through storms in their AC130 aircraft. It's important to understand what is going on inside and around the storm to understand its strength and its track.
- U.S. tropical cyclone deaths distribution (1962-2011): Storm surge (50%), Rainfall-induced floods (25%), Surf (5%), Offshore (5%), Winds (5%), Tornado (5%), Unknown (5%)

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We hope you have enjoyed learning all about hurricanes from this month's module. Be sure to stay hurricane aware and prepared during hurricane season!